Faculty Working Papers

THE NATURE OF DISCIPLINES AND THE CONDUCT OF INTERDISCIPLINARY INQUIRY

Howard W. Melton

#238

College of Commerce and Business Administration
University of Illinois at Urbana-Champaign

FACULTY WORKING PAPERS

College of Commerce and Business Administration

University of Illinois at Urbana-Champaign

March 24, 1975

THE NATURE OF DISCIPLINES AND THE CONDUCT OF INTERDISCIPLINARY INQUIRY

Howard W. Melton

#238

THE NATURE OF DISCIPLINES AND THE CONDUCT OF INTERDISCIPLINARY INQUIRY

by

Howard W. Melton*

*Assistant Professor Accountancy and Business Administration,
The University of Illinois at Urbana-Champaign.

THE NATURE OF DISCIPLINES AND THE CONDUCT OF INTERDISCIPLINARY INQUIRY

Society has assigned academia a major role in regard to prepetuating and expanding human knowledge, therefore, it is appropriate that attention be focused upon the process by which this task is achieved and the ways in which it might be facilitated. Due in part to the interdependence among academic disciplines, the development of new knowledge in particularly complex. No discipline and few problems exist in isolation. As a consequence indisciplinary inquiry has gained increasing significance though our understanding of this process remains primative. The primary objective of this paper is to suggest strategies for the implementation of interdisciplinary inquiry. In order to address this question, the nature of academic disciplines and the process by which they conduct inquiry will first be discussed.

The Nature of Disciplines

An academic discipline can be said to exist when (1) a faculty specifies a subject matter acceptable to other faculties as its area of inquiry, (2) there exists a distinct body of knowledge relating to this area of inquiry, and (3) there is an academically acceptable means for expanding this body of knowledge. In the abstract, it may be that disciplines appeared with the development of the earliest specialized societal institutions intended to perpetuate and expand knowledge. Whatever the origin, their development has been accelerated and their importance has been augmented by the rapid expansion of human knowledge, both qualitative and quantitative, and the

Digitized by the Internet Archive
in 2012 with funding from
University of Illinois Urbana-Champaign

http://www.archive.org/details/natureofdiscipli238melt

development of higher education as a major societal institution.

Although some specialization existed prior to the eighteenth century, most branches of human knowledge were sufficiently limited in scope and in the need for specialized training so as to make them generally accessible to the relatively small percentage of the population that one might consider as being well educated. In the later half of the eighteenth century, human knowledge began to expand at an increasingly rapid rate, this body of knowledge began to be broken up into distinct fields of inquiry, and specialists, both academic and non-academic, began to appear. The formative stages of the development of higher education as a major institutional force within society occurred at approximately the same time.

The earliest beginnings of our contemporary system of higher education are lost in antiquity. The distinctive dimension of the changes that occurred in the late eighteenth and early nineteenth centuries was the development of the university as a societal institution having a major responsibility for perpetuating and expanding human knowledge. Particularly in the United States, institutions of higher education, expanded rapidly throughout the nineteenth century in terms of size, quality, and the scope of their curriculum.[1]

The rapid expansion of knowledge and the development of institutions of higher education speeded the development of academic specialities or, as they were previously defined, disciplines. Disciplines reflect in part an arbitrary segmentation of human knowledge and, particularly as to subject matter, they may overlap. The boundaries of disciplines are not rigid but rather tend to expand and contract over time. New disciplines may

---

[1]For further discussion of the development of higher education during this period see J. C. Furnas, The Americans: A Social History of the United States 1587-1914 226-236 (1969) and Daniel J. Boorstin, The Americans: The Democratic Experience 478-501 (1973).

arise and older disciplines have sometimes ceased to exist or been absorbed by others. Regardless of these facts, the complexity and breadth of human knowledge requires the segmentation provided by disciplines and disciplines have represented an appropriate means of formally organizing our universities.

The conventional classification of disciplines includes (1) natural sciences (chemistry, biology, physics), (2) social sciences (economics, sociology, psychology, political science), and (3) humanities (language, art, music). This classification scheme reflects differences among disciplines in regard to both the subject matter of their inquiry and the methodological tools used in their expansion. Such classifications have little value in of themselves but are useful when further discussing the nature of disciplines and academic inquiry.

A means or technique of expanding knowledge may be characterized as a methodology, a concept distinct from that of a discipline. The value of a methodology lies in its application in the process of problem solution. Though a specific methodology may be developed within a given discipline, its application is not conceptually limited to that discipline and it frequently will be utilized within multiple disciplines. Therefore, psychology is clearly a discipline and is so independent of the methodology of behavioral science to which psychologists have richly contributed. Likewise, the disciplines of sociology, organizational behavior, and others have both utilized and contributed towards the development of the methodology of behavioral science.

Though academic institutions are in fact organized by disciplines, the importance of this consideration tends to be blurred by our contemporary fascination with the concept of scientific inquiry and by its impact upon the process of academic inquiry. Science relates to the formulation of

the laws of nature and the specifications of substances, events, and behaviors in descriptions sufficiently broad and abstract to encompass as large a set of factual situations as possible.[2] While the methodology of the scientific process is not to be equated with science, the methodology employed has tended to denote the application of systemized procedures and implies a decision-process utilizing the laws of logic.[3] The success of scientific truth-seeking in the natural sciences has led to continuing attempts to apply the rigor and precision of the scientific method to other disciplines and particularly to the social sciences. In the social sciences this application has included attempts to articulate grand theories and to test hypotheses by empirical research. While the results of such efforts have been fruitful from the standpoint of forcing specificity in terms of theory and research practice, social scientists continue to be frustrated by the difficulty of applying the scientific method to subject areas as complex as human and social behavior. In contrast to the natural sciences and the social scineces are the disciplines we class as humanities. As a whole the humanities have steadfastly avoided identification as sciences emphasizing their concern with the expressions, interests, and ideas of man.[4]

---

[2]Reno Dubos, Reason Awake: Science for Man 20 (1970).

[3]Abraham Kaplan, The Conduct of Inquiry 24 (1964).

[4]The relationship between the scientist and the philosopher is explored in Joseph Ben-David, The Scientist's Role in Society 24-32 (1971) and the scientist and the humanist in Hans L. Zetterbert, On Theory and Verification in Sociology 1-29 (1966). While recognizing the value of science as a means of problem solution, this paper emphasizes the impact of disciplines both because they reflect the manner in which academia has divided its subject matter of inquiry and because they encompass the entire scope of human knowledge.

While one may argue that the classification of disciplines as between sciences, social-sciences, and humanities is a distinction based largely upon the methodology employed and the subject matter of the inquiry, the importance of the distinctions drawn lie in their reflection of our attitudes towards science and the process of academic inquiry. The past quarter century has seen the continuing veneration of scientific inquiry. This in turn has led some to argue that only scientific endeavor can legitimately be viewed as inquiry, or research, as it is commonly referred to in academic circles. Such attitudes are further reflected by those who place great emphasis upon that portion of the scientific process concerned with empirical hypothesis testing.[5] Since our definition of a discipline requires the existence of an acceptable means of expanding knowledge, the final consideration of this portion of the paper is the examination of the nature of human knowledge and its expansion.

Academic inquiry may be defined as a means or process of expanding a body of knowledge. In ascertaining whether a specific undertaking might be classified as inquiry, we must examine the relationship that exists between the body of human knowledge and academia. Academia has a major responsibility for preserving, transferring, and expanding human knowledge. While all academic disciplines clearly meet the test of preserving and transferring knowledge, a question arises as to the extent certain disciplines, particularly the social sciences and humanities, can be said to be expanding this knowledge. If the expansion of knowledge can only take place through utilization of the scientific method, inquiry, or research, may be equated

---

[5]Empirical research has been given great impetus by the development of of computerized data processing and analysis. Though of great usefulness, there is some temptation to use this ability to collect, process, and analyze vast quantities of data at the expenses of rigorous problem definition and experimental design.

with science. Clearly, this is fallacious for many aspects of experience, whether moral, ethical, philosophical, or untestable theories concerning human behavior, represent knowledge and their elaboration and expansion deserves to be recognized as the output of the process of inquiry.

One might further ask whether the activities commonly associated with such disciplines as English, law, and history represents a greater or lesser degree of the expansion of knowledge when compared with the natural sciences. The answer to the question is debatable for in all disciplines a major portion of the activity we identify as the process of inquiry in fact represents attempts to codify existing knowledge or replicate previous experiments. This is in contrast to theory building and unique experimentation which may represent the only actual expansion of knowledge. The ultimate utility of the inquiry conducted within a given discipline lies not in its mode of conduct, but in its success in explaining reality, answering existing problems, and predicting future behavior.

The Conduct of Academic Inquiry

If the existence of disciplines is accepted, we must next focus upon the conduct of academic inquiry. In general terms, academic inqiury is a process for problem solution operationalized by a decision process operating within boundaries defined by a disciplinary paradigm.[6] Differences among disciplines

---

[6] In this paper, disciplinary paradigms represent a specialized utilization of the "paradigm" concept articulated by Thomas S. Kuhn, The Structure of Scientific Revolutions (1962). Whereas Kuhn generally restricted the concept of the paradigm to the sciences and more specifically to those sciences with a developed and accepted theoritical framework, this paper argues that disciplinary paradigms exit regardless of the existence and acceptance of such a framework. Further it is assumed that science is only one of several acceptable modes of acquiring and expanding knowledge, that it would be inappropriate for all disciplines to conduct themselves as sciences, and that a concept of paradigms restricted to the more mature sciences does not, in any case, apply to the activities of many disciplines. Regardless of any differences, certian common conceptual attributes of the two types of paradigms emerge including their dynamic nature, their effect upon problem formulation and the interpretation of data, their impact in terms of the socialization of disciplinary practitioners, and the potential distinction between paradigms as manifestations within the disciples themselves in contrast to the paradigms held by individual practitioners or disciplinary subgroups.

in terms of problem identification and solution reflect differences among various disciplinary paradigms.

A disciplinary paradigm exists within each discipline. Among the more significant elements of the paradigm are a system of inquary and a body of theory. The interaction of these two elements influence both problem definition and the choice of methodology within the discipline. Though it may lead to stagnation, may change, and may be replaced, a paradigm is operating within every discipline at any given point in time. The system of inquiry reflects the fundamental approach utilized when engaged in the process of research.[7] It defines the disciplinary decision process including its system of logic. In contrast, methodology defines the techniques to be utilized when obtainng data for this decision process. The body of theory is both a framework relating the diverse elements of the disciplinary body of knowledge and the discipline's primary predictive model. The extent to which the theory is developed and the degree to which a single framework is uniformly agreed to, may very significantly from one discipline to another. Problem selection and disciplinary direction are influenced both by attempts of practitioners to complete the theoretical framework and by the self-selecting nature of the paradigm itself. As a consequence

---

[7]Alternative systems of inquiry exist and reflect differences in culture, philosophy, and academic orientation. For further discussion, see Ian I. Mitroff and Louis R. Pondy, "On the Organization of Inquiry: A Comparison of Some Radically Different Approaches to Policy Analysis," 34 Public Administration Review 471 (September/October 1974) and Ian I. Mitroff, Frederick Betz, Louis R. Pondy, and Francisco Sagustir, "On Managing Science in the Systems Age: Two Schemes for the Study of Science as a Whole System Phenomenon," 4 Interfaces 46 (May, 1974).

disciplines can arrive at different conclusions in regard to the same problem because they apply a different body of theory, utilize a different system of inquiry, define the problem differently, or utilize different methodologies.

The overlapping of areas of disciplinary concern points to the first basis for interdisciplinary inquiry. A second and more compelling basis lies in the awareness that empirical problems are seldom bounded by the narrow dominion of traditional academic disciplines, the recognition of the potential power of examining a specific problem from multiple points of view, and the desire of combining and utilizing multiple research strategies and methodologies in regard to a specific problem.

Regardless of desirability of interdisciplinary inquiry, difficult problems impede the successful implementation of this strategy. The major problem lies in the lack of compatability of the various disciplinary paradigms as reflected by different bodies of theory, systems of inquiry, problem definitions, and methodologies. The second task of this paper is to develop strategies for utilizing the problem solving potential of two or more disciplines to solve complex empirical problems.

Strategies to Be Employed in the Conduct of Interdisciplinary Inquiry

At least five strategies can be utilized in the conduct of an interdisciplinary inquiry. These are (1) task differentiation, (2) ad hoc experimentation, (3) disciplinary specification, (4) the building block approach, and (5) multiple examination. Each strategy will be dealt with

at some length.[8]

Task differentiation relates to the examination of different facets of a problem by independent disciplinary studies without any attempt to integrate the work of the various participants. While this strategy avoids the problem of reconciling differences among the various disciplinary paradigms, two significant problems exist in regard to this approach. First, there is the requirement that the problem be divided into segments. This division of responsibility will be affected by the paradigms utilized by those carrying out this task, therefore, you have not avoided the basic problem of paradigmatic conflict. Secondly, there is substantial doubt whether this approach should be considered interdisciplinary in any case. The potential of an interdisciplinary strategy lies in the greater power and scope of inquiry made possible by integrating multiple methodologies, bodies of theory, and strategies of inquiry. Since this integration does not take place, task differentiation lacks the essential attributes of an interdisciplinary strategy.

While ad hoc experimentation may be the purest form of interdisciplinary strategy, it is by far the most difficult to implement. Ad hoc experimentation involves a blending of methodology, theory, and strategies

---

[8]While published studies do exist concerning cross-cultural communication few suggestions have been advanced concerning the cross-professional or cross-disciplinary communications which lie at the heart of attempts to facilitate interdisciplinary inquiry. One suggestion has been the technique of trans-spection wherein one erases as much of their own paradigm as possible and "gets into and thinks the paradigm of another person." Magoroh Maruyama, "Paradigms and Communication," 6 Technological Forecasting and Social Change 26 (1974). Though the feasibility of trans-spection in open to serious question, elements of this technique are implied in the ad hoc experimentation strategy.

of inquiry. Applicable elements are drawn from participating disciplines in effect creating a unique paradigm for examining a specific problem. Although this approach is a normative ideal for interdisciplinary undertakings, its feasibility depends upon the degree to which paradigms are in fact flexible. The flexibility and corresponding rigidity of paradigms involves both disciplinary and personal dimensions. While clearly changing over time, disciplines, and as a consequence disciplinary paradigms, do not frequently exhibit great flexibility. Theory, strategy of inquiry, scope of inquiry, and methodology are frequently rigidly defined, therefore, from a disciplinary standpoint, ad hoc experimentation may only exist as an ideal. Disciplines, however, are made up of individual practitioners who often do vary significant in terms of the degree to which they are socialized to disciplinary norms. The existence of at least some disciplinary practitioners who do not slavish adhere to a single disciplinary paradigm suggests ad hoc experimentation is perhaps selectively feasible.

Additional support for the ad hoc experimentation strategy lies in an alternative concept as to the nature of disciplines. Rather than treating disciplines as monoliths, they may be said to result from the gathering of individuals sharing common ideas and interests. Through group interaction, compromise takes place and a pardigm is developed. As the groups become larger, agreement is more difficult to obtain thus accounting for sub-disciplines and related groupings. If the "jargon group" concept is accurate, disciplines have no identity separate from that of their individual members. While this view of disciplines may properly reflect the relationship between disciplines and a minority of their members, it fails to account for the substantial effect disciplinary paradigms have in terms of molding their own practitioners and the consequential adherence of these practitioners to

their discipline and its disciplinary paradigm.

In view of the preceding comments, ad hoc experimentation is only likely to be successful when involving a select subset of practitioners, those individuals who, for whatever reasons, have the inclination and interest to look beyond the paradigm of their own discipline. Even among those with the inclination, the creation of a special problem-directed paradigm may become an overwhelming task, therefore, making this strategy suitable only in the context of more substantial research undertakings.

Disciplinary specification is a strategy involving the following procedures: (1) After an examination of the problem, a determination is made as to the discipline whose process of inquiry is most likely to yield a satisfactory solution to the issues in question, (2) the disciplinary paradigm of the discipline chosen is utilized as the paradigm for the study and (3) applicable methodologies from the various participating disciplines are used for the purpose of data acquisition and analysis. Several observations are in order concerning this approach. The selection of the disciplinary paradigm results from both objective attempts to select the most applicable paradigm as well as subjective consideration including the effect of the paradigm used by those making the decision.

Among the advantages of the disciplinary specification approach is that it requires careful examination and consensus on the part of the team members in regard to the formulation of the problem and the choice of the disciplinary paradigm. The selection of a single paradigm gives the researchers a conceptual framework and a focal point towards which they can direct their cooperative efforts. The paradigm selected will significantly influenced the framing of the specific questions to be examined. Even if disciplinary specification is interdisciplinary only to the extent that

methodologies are employed from disciplines other than the lead discipline, it is of value to identify those methodologies which are applicable but otherwise unknown to the practitioners of the lend discipline.

Regardless of its advantages, several limitations affect the usefulness of the disciplinary specification approach. Using a single paradigm to define a problem raises the possibility that innovative perspectives will not evolve and novel relationships will not be noted in the face of the perceptual limitations of the paradigm in use. The need for participants to agree to utilize a single disciplinary paradigm limits the scope of the inquiry and invites conflict between participants. There, also, will be a need for compatibility among the various methodologies employed. The greatest problem facing users of this strategy, however, is the requirement that members of disciplines other than the lead discipline must utilize a foreign paradigm - an exceedingly difficult task for most academic practitioners.

The building block approach is a fourth strategy for undertaking interdisciplinary inquiry. Initial implementation of this approach requires (1) in-depth consideration of the structure of the problem being examined, (2) specifications of the relationship of the components found within the problem, and (3) assignment of research responsibility for the components identified to each of the various participating disciplines. The process of problem specification and paradigm assignment will normally involve an unstructured decision-making process. It incorporates an objective examination of the problem and the available disciplinary resources and is influenced, at a subjective level, by the disciplinary paradigms of those making the decisions.

Normally, users of the building block approach segment the problem into

hierarchical components and a disciplinary - centered study is made for each component. The paradigm of the discipline conducting a specific study is used for that study and the output of the study of the most subsidiary component becomes an input in regard to the study of the next level of the problem. The methodology used for securing data may be either that of the discipline conducting a specific study or of another disciple. As a consequence, the building block approach assumes that the various studies are interrelated while maintaining the integrity of individual disciplinary analyses. The activation of this strategy can be illustrated by a simple example.

If a problem is deemed to primarily require a psychological analysis, it is the psychological paradigm that provides the ultimate analysis of the problem. If among the subsidiary issues of the problem is a question to which an economic analysis would be applicable, the analysis of the subsidiary issue is prepared as on economic study and the results of this undertaking will become an input to the primary, in this case psychological, analysis. Clearly, the building block strategy can be utilized in multiple configurations. Whereas the example given has only two components and two levels, more complex problems may involve multiple components and multiple levels. A single component may provide inputs to a single or multiple studies. Although the purest application of the building block approach envisions that a problem be ultimately resolved by a single paradigm, the process may stop short of this final integrative analysis with a solution in terms of two or more disciplinary analyses.

With the exception of ad hoc experimentation, the building block approach is likely the most advantageous interdisciplinary strategy. Each disciplinary paradigm is applied to the components of the problem to which

it is most relevant. There is no need for compatability to exist among the methodologies employed by the various disciplines, for only the results of preceeding studies become inputs for subsequent studies. In common with other strategies, the paradigms of the participating disciplines do act as successive filters of the data analyzed, the information reported, and the inputs utilized. Paradigms affect the interpretation of inputs and complicate the communication between disciplines. Regardless, the building block approach appears to be a fruitful method for undertaking interdisciplinary inquiries while accepting the existence and utilizing the expertise of traditional disciplines.

A fifth and final strategy is that of multiple examination wherein a specified problem is examined by simultaneous, independent studies. While the filtration problem is eliminated, there is no organized means of intergrating the diverse findings that may result and the cost of multiple studies is generally prohibative. Further, there is some doubt whether the results of independent investigations of complex problems are in fact additive, for the value of interdisciplinary inquiry lies in its assumption that the blending of disciplinary approaches and tools yields a result superior to the sum of the output of individual studies and at the very least provides a means to integrate diverse research methods and results.

Summary

To facilitate the consideration of the primary objective of this paper, the nature of academic disciplines, the relationship of science to the process of disciplinary inquiry, the manner in which inquiry is conducted, and the reasons why interdisciplinary inquiry is sometimes desirable were first discussed. Five strategies for conducting interdisciplinary inquiries were then introduced. These are (1) task differentiation, (2) ad hoc

experimentation, (3) disciplinary specification, (4) the building block approach, and (5) multiple experimentation. Of these strategies, ad hoc experimentation was characterized as being the ideal in regard to implementing interdisciplinary strategies. Since ad hoc experimentation is frequently, if not always, unattainable the building block approach was advanced as the most feasible of the remaining four strategies for the conduct of interdisciplinary inquiry.

UNIVERSITY OF ILLINOIS-URBANA
3 0112 060296701